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## A CASE OF THE OCCURRENCE OF *ASCARIS TRI- QUETRA* SCHRANK IN DOGS \*

A. C. WALTON

While working on the spermatogenesis of certain Ascaridae last year, I found that the chromosomes of the ascarids from dogs did not agree with those of the ascarids from the dog as given by Kultschitzky (1888) and by Marcus (1906) either in number, behavior, or the presence of an idiochromosome group. The work of Glaue (1908, 1909, 1910) has shown conclusively that the ascarids of the dog and of the cat are anatomically distinct species, which should be designated respectively as *Ascaris canis* Werner, and *Ascaris felis* Goeze, and not merely varieties of *Ascaris mystax* Zeder. The work of Edwards (1911) on *A. felis* and that of Marcus (1906) on *A. canis* have given us conclusive evidence that these two forms are entirely dissimilar as to the number and the behavior of the chromosomes. From these taxonomic and cytological proofs, the long mooted question of the identity of the two varieties seemed definitely settled; but the apparent contradiction in the gametogenesis of the dog ascarids shown by my discovery seemed to me sufficient to warrant the reopening of the question. If the number and behavior of the chromosomes in *Ascaris canis* were similar to the number and behavior of those in *Ascaris felis*, the two forms might be in fact only sub-species; varying taxonomically owing to their different environments.

The results of my study are contained in a paper now in press, the taxonomic work of which showed that the species with which I was working were the ones recognized by helminthologists as the usual inhabitants of the intestine of the dog and the cat, respectively. My work on the gametogenesis of *A. felis* agreed with that of Edwards (1911) in showing nine chromosomes as the haploid number, one of which is a member of an X-Y idiochromosome pair.

Marcus (1906) has shown that what he called *A. canis* has ten paired and two unpaired tetrad chromosomes as the diploid number. From his description it seems probable that these two unpaired chromosomes act as members of an X-Y idiochromosome group, but he did not so call them. My work on the commonest parasite of the dog has shown that in the male there are thirty tetrad chromosomes as the diploid number, of which twenty-four are united in pairs, and the

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other six form a heterochromosome group of the X type. The female has thirty-six tetrads (eighteen di-tetrads) as the diploid number.

Private correspondence between Dr. S. I. Kornhauser, of Northwestern University, and Dr. Marcus has shown that the majority of the material upon which the latter based his work was *not* obtained from dogs, but came mostly from other members of the dog family and also from bears.

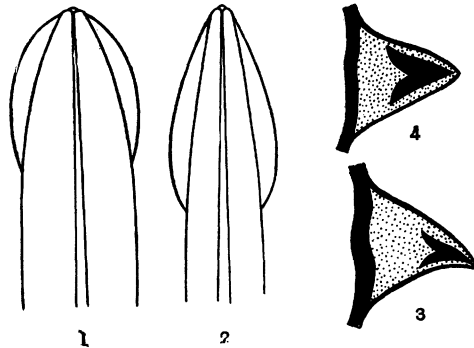


Fig. 1.—Dorsal aspect of the anterior end of *Ascaris triquetra* Schrank ( $\times 25$ ).

Fig. 2.—Same view of *Ascaris canis* Werner ( $\times 25$ ).

Fig. 3.—Cross-section. Posterior aspect of the right wing of *A. triquetra* ( $\times 160$ ).

Fig. 4.—Same for *A. canis* ( $\times 160$ ).

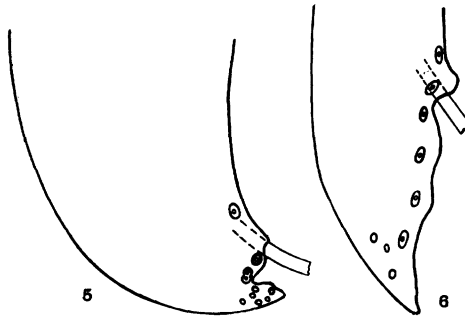


Fig. 5.—Lateral view of the right side of posterior end of male *A. triquetra* ( $\times 25$ ).

Fig. 6.—Same view of male *A. canis* ( $\times 25$ ).

All drawings were made with the aid of a camera lucida.

During the past two years I have been able to examine worms taken from twenty-five dogs, and of the total of two hundred worms thus obtained, all but two have answered taxonomically and cytologically to the type described above as the commonest *Ascaris* in dogs i. e., *Ascaris canis* Werner. These two exceptional specimens, a male

and a female of the same species, differed considerably in taxonomy from the ordinary type of *Ascaris canis* Werner. The following table compares the main features of the two forms:

	<i>A. canis</i> Werner	<i>A. triquetra</i> Schrank
Length of male.....	120 mm.....	60 mm.
Length of female.....	220 mm.....	100 mm.
Shape of oral wing.....	Lanceolate .....	Broadly lanceolate
Thickness of oral wing....	0.17 mm.....	0.18 mm.
Breadth of oral wing.....	0.165 mm.....	0.18 mm.
Length of oral wing.....	2.7 mm.....	1.9 mm.
Chitin rod of wing.....	Long and broad.....	Shorter and narrower
Post-anal papillae.....	7 .....	8
Ventral row.....	4 .....	4 (one double).
Dorsal row.....	3 .....	4 (2 rows, 2 each)
Shape of tail of male....	Slopes gradually to a point .....	Bends sharply ventrad to a short, blunt end

The comparison of the two species shows that the less common one agrees with *Ascaris triquetra* Schrank, which earlier writers believed to be synonymous with *A. mystax* Zeder and *A. marginata* Rudolphi. Marcus (1906) had identified his *A. canis* with the *A. marginata* studied by Kultschitzky (1888). Cytological examination of the sex cells of this *Ascaris triquetra* Schrank shows that there are twenty tetrad chromosomes, arranged in ten pairs, and also two unpaired tetrads, as the diploid number. This agrees with the facts recorded by Marcus for his material, and I believe, therefore, that the *Ascaris* studied by him was also *Ascaris triquetra* Schrank, known to Kultschitzky as *Ascaris marginata* Rudolphi.

My work, then, has shown that, while *Ascaris canis* Werner is the common parasitic nematode of the dog, *Ascaris triquetra* Schrank may be an inhabitant of the same dog that harbors individuals of the species *A. canis* Werner, though this occurs only rarely. It has also shown that the nematode studied by Marcus (1906) was probably *Ascaris triquetra* Schrank, rather than *Ascaris canis* Werner.

I wish here to express my obligation to Dr. S. I. Kornhauser for his notes and especially to Dr. E. L. Mark for his supervision of the preparation of this paper.

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